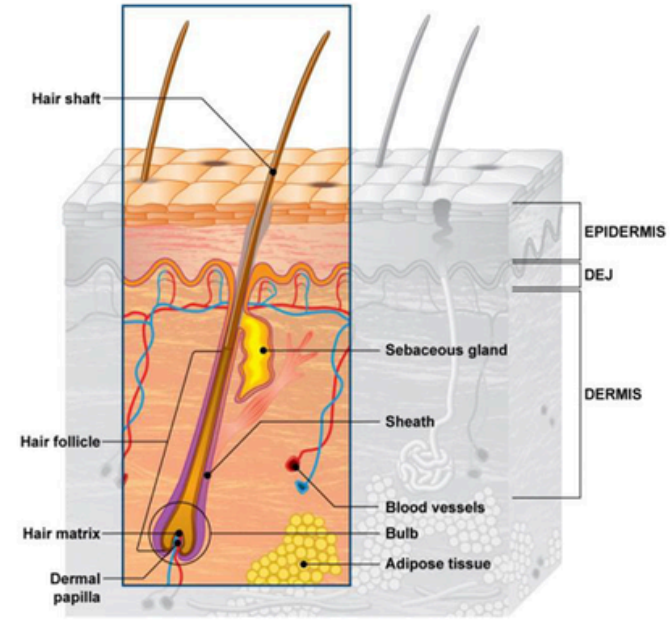
The science of hair

Hair appears much more complex that they look and they play a vital role in our appearance. They are composed of strong structural protein called keratin. Below the surface of the skin is the hair root, which is enclosed within a hair follicle.

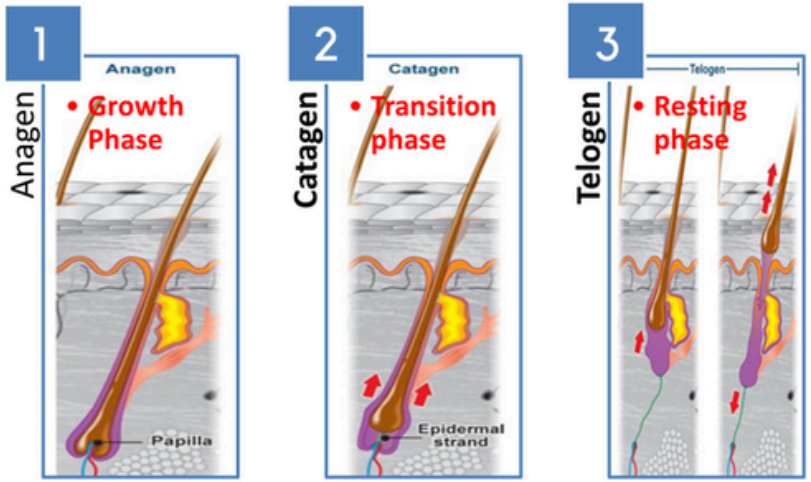
At the base of the follicle is the dermal papilla. The dermal papilla is feed by the bloodstream which carries nourishment to produce new hair.

The dermal papilla plays a crucial role in the dermal-epidermal interactions and is of great importance for the hair formation and growth cycle.



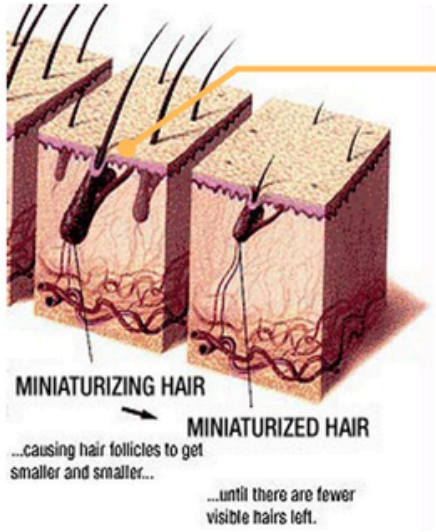
Hair cycle

The hair growth cycle is composed of three distinct phases: anagen, catagen, and telogen. Each phase is characterized by specific changes in hair follicle morphology, cell activity, and hair shaft growth. These phases are orchestrated by intricate molecular and cellular interactions that govern the overall hair growth cycle.



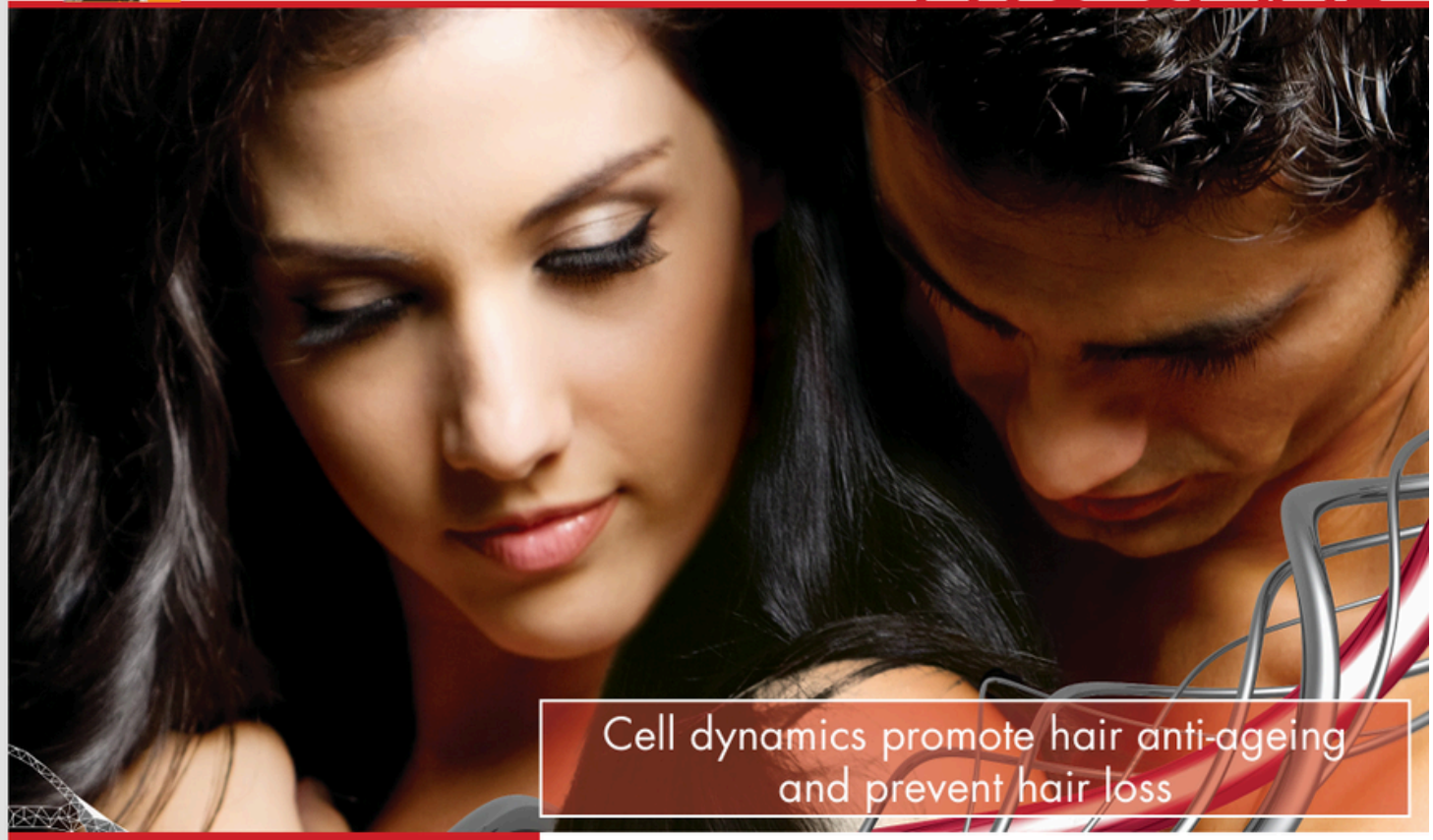
Hair loss

Any change in Hair growth cycle leads to hair loss, also called as alopecia, is a common problem affecting both men and women. The most common type of hair loss is androgenetic alopecic (AGA) both in men (male pattern baldness) and women (female pattern hair loss) and is caused by heredity hormones and genetics.



- Shrinkage of hair follicles
- Gradual increase of telogen phase
- Reduction in A:T ratio
- Result in hair loss & visible baldness

PROCAPIL®



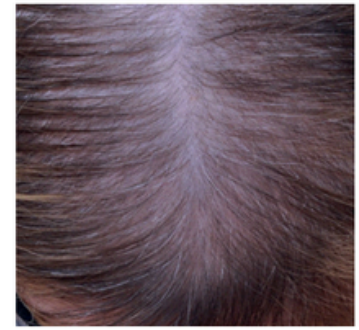
FUNCTION Fortifies and rejuvenates hair follicle to prevent hair loss for both men and women.

DEFINITION Combination of a vitaminated matrikine (biotinyl-GHK) with apigenin (a natural flavonoid) and oleanolic acid from natural origin.

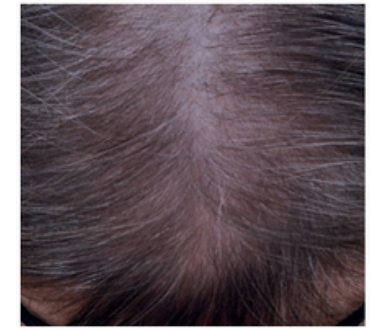
PROPERTIES PROCAPIL® promotes hair anchoring by strengthening the follicle metabolism and structure.

CHARACTERISTICS Oleanolic acid inhibits 5α-reductase, apigenin improves micro-circulation and biotinyl-GHK stimulates cell metabolism.

APPLICATIONS Hair strengthening and anti-hair loss treatments: lotions, conditioners, leave-on, hair



before



after 4 months

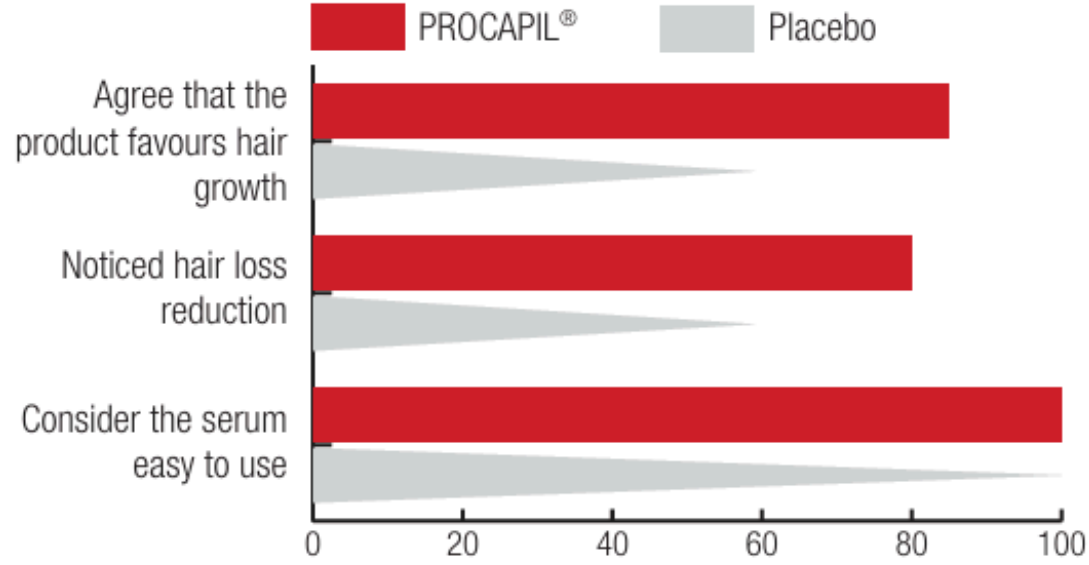
The proportion of hair observed in anagen phase (A) and telogen phase (T) was determined and the ratio A/T established. Hair samples were taken and analysed.

n=42 females (FPHL grade 1-2) applied a serum with 3% PROCAPIL® (n=21) or a placebo (n=21) for 4 months with a massage, min. 3 times a week.

A/T (Mean value)	PROCAPIL® on female panel	PLACEBO
T0	5.08	4.85
T4 months	**9.57**	6.17

Procapil® promotes the slow down in hair loss by increasing the anagen hair while reducing the telogen hair for both male and female volunteers.

- **Self-evaluation**



The tested formulation was totally accepted by the panel. The volunteers perceived the benefits of the serum on the density of their hair.

CLAIM SUBSTANTIATION

in vitro STIMULATION OF CELL METABOLISM

MITOSIS RATE

Evaluation of root sheath keratinocytes after a 14-day culture of hair follicles. Biotinyl-GHK (2 ppm) stimulates Ki-67 expression, indicating enhanced cell proliferation.

GENE EXPRESSION

PROCAPIL® promotes the expression of numerous genes involved in tissue repair mechanisms (DNA-array on 3D SkinEthic® epidermis).

Gene	Activity	Activation
Laminin binding protein	Adhesion	+146%
Acetyl CoA transferase	Cell metabolism	+137%
Cytokeratins 10	Differentiation	+154%

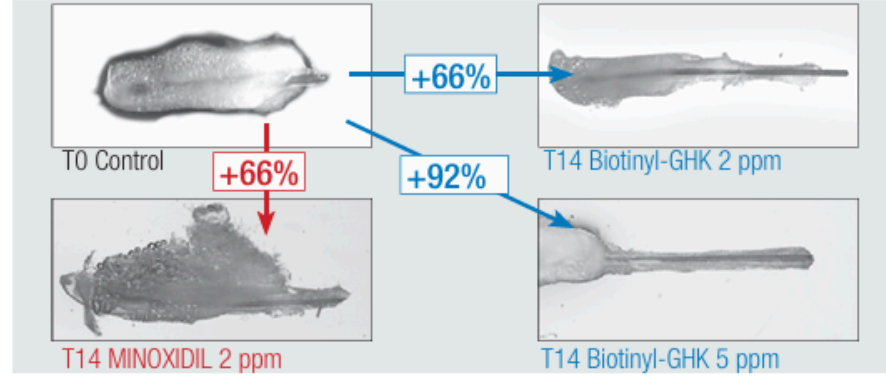
HAIR ANCHORING

Hair follicles are incubated for 14 days with biotinyl-GHK (2 ppm). Morphological observation of the dermis/root sheath junction. Laminin 5 and collagen IV are revealed by immunofluorescence.

Presence of adhesion molecules	T14 Control	T14 PROCAPIL®
Laminin 5	+	+++
Collagen IV	+	++++

STIMULATION OF HAIR GROWTH

Hair follicles are incubated for 14 days with biotinyl-GHK or minoxidil (2 ppm).



Biotinyl-GHK is as efficient as minoxidil at the same concentration (2ppm).

The persisting dermis/root sheath junction is thick and recovers its normal sinusoidal shape.

PROCAPIL® provides a protecting and repairing effect on the structure components of the hair follicle, slowing down the ageing process.

Kopexil Aqua

Key benefits of Kopexyl Aqua

- Regrow hair lost
- Boost hair thickness
- Optimizes hair growth cycle
- Fights against hair loss (5-alpha reductase)
- Results in visible hair rebirth
- No dry scalp, dandruff & itchiness

*patent pending "water soluble compositions for treating hair loss & promoting hair growth"

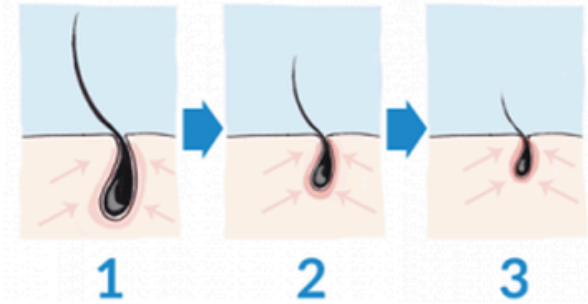
Efficacy studies

DHT inhibitation essay

Evaluation of possible 5-alpha reductase inhibitory activity of test items using dihydrotestosterone (DHT) assay in DU-145 (human prostate cancer) cells.

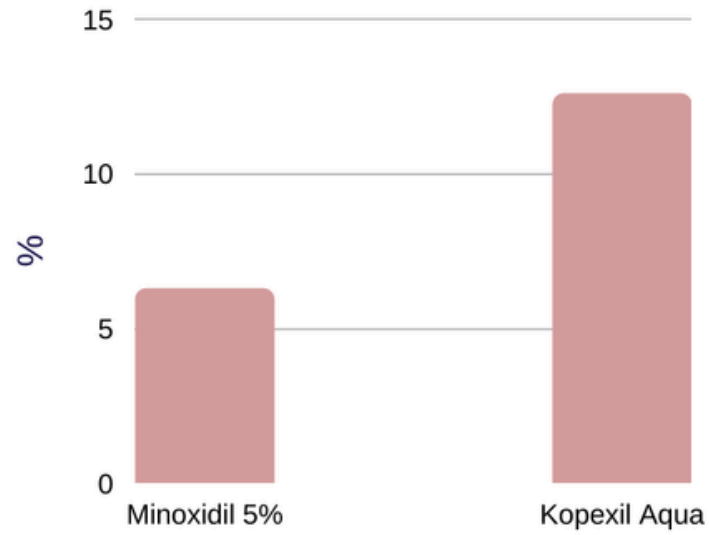
Mechanism of action of hair loss

Testosterone —(5-α reductase)→ DHT → DHT shortens hair growth cycle → follicles miniaturization → producing progressively shorter & finer hair → Hair loss



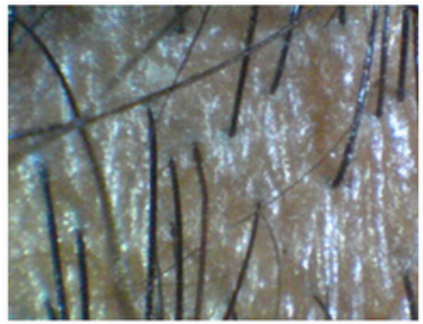
Improvement in m-RNA expression

Open label phase-II clinical study was carried out on 60 subjects (male) to evaluate the safety and efficacy of these water-soluble compositions along with 5% solution of Minoxidil (market sample) and were found to be therapeutically more superior to Minoxidil.

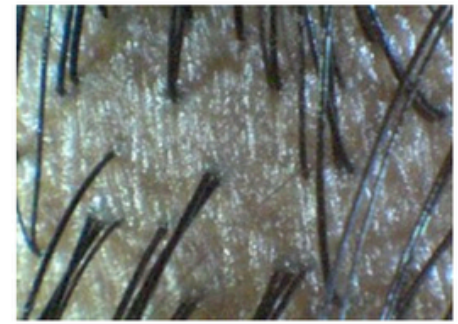


Hair density

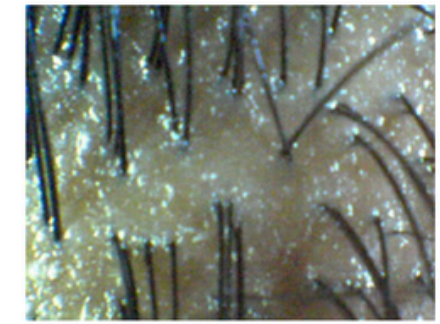
There was significant increase in the hair density when compared from baseline to month 5. The percentage of hair density shown from baseline to month 2, month 4 and month 5 was 49, 69 and 75 respectively.



Month 2



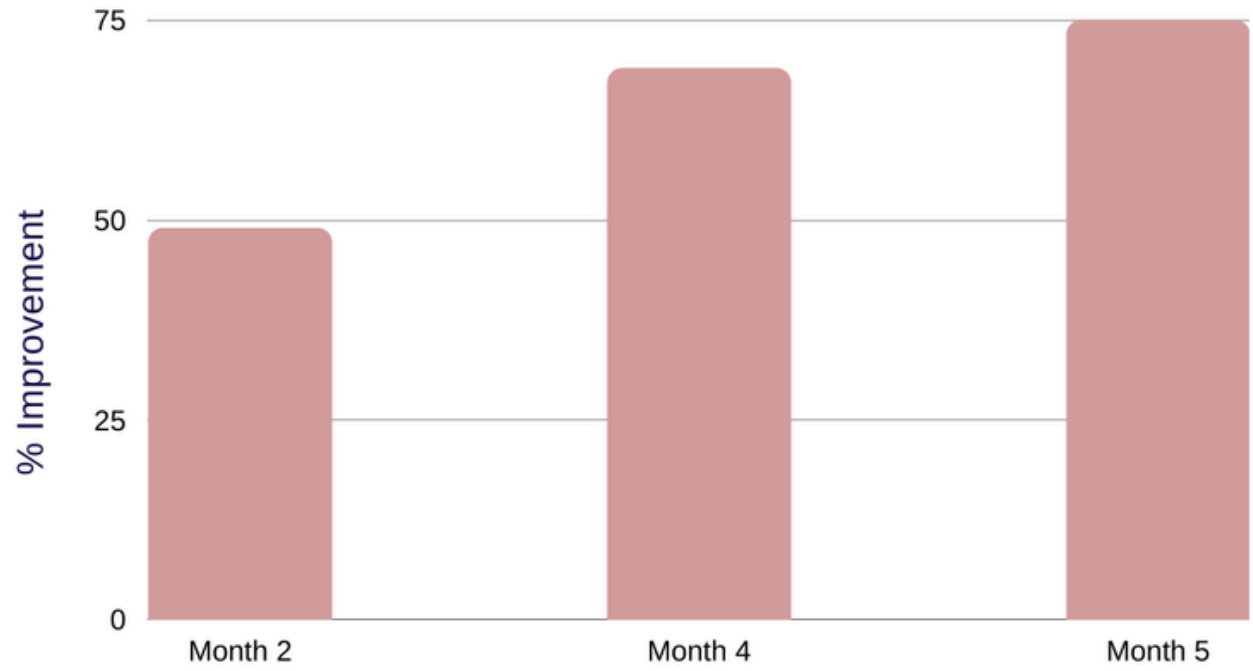
Month 4



Month 5

Efficacy data

% Improvement of hair density for Kopexyl Aqua



Efficacy data

% Improvement of hair growth for Kopexyl Aqua